I CLAIM:

1. A method of suppressing ringing artifacts during digital resizing of an image, said method comprising:

calculating a first difference between two inner of four adjacent image samples;

calculating a second difference between two outer of said four samples;

correcting said first and second differences by inverting the sign of said first and second differences when said first difference is negative;

tripling said first corrected difference;

comparing said second corrected difference with said tripled first corrected difference; and

suppressing ringing artifacts between said two inner samples using a linear interpolation model when said second corrected difference is greater than said tripled first corrected difference.

2. The method of claim 1 further comprising suppressing ringing artifacts between said two inner samples using a linear interpolation model when said first difference is zero.

3. The method of claim 2 wherein each said suppressing of ringing artifacts occurs independently in each axis in a two dimensional image.

4. The method of claim 2 further comprising

using an interpolation model with an emphasized frequency response characteristic with said two inner samples when said second corrected difference is less than the negative of said first corrected difference.

5. The method of claim 4 wherein said interpolation model comprises cubic polynomial models.

6. A method of detecting ringing artifacts during digital resizing of an image, said method comprising:

calculating a first difference between two inner of four adjacent image samples;

calculating a second difference between two outer of said four samples;

comparing said first difference with zero;

tripling said first difference; and

comparing said second difference with said tripled first difference; wherein:

said ringing is detected when either said first difference equals zero or said second difference is greater than said tripled first difference.

7. A method of suppressing ringing artifacts during digital image resizing, said method comprising:

calculating a difference between two inner of four adjacent image samples;

setting a first gradient equal to said

difference; and

setting a second gradient equal to said difference;

8. The method of claim 7 wherein said first and second gradients are used to generate a continuous signal model of an image being resized.

9. The method of claim 8 wherein said first and second gradients are used to calculate coefficients of said continuous signal model.

10. A method of digitally down-sampling an image, said method comprising:

detecting whether ringing artifacts are present;

calculating a first gradient as one-half the difference between a third and a first of four adjacent image samples when said ringing is not detected; and

calculating a second gradient as one-half the difference between a fourth and a second of said four samples when said ringing is not detected.

11. The method of claim 10 wherein said first and second gradients are used to generate a continuous signal model of an image being resized.

12. The method of claim 11 wherein said first and second gradients are used to calculate coefficients of said continuous signal model.

13. A method of digitally up-sampling an image, said method comprising:

calculating a first difference between two inner of four adjacent image samples;

calculating a second difference between two outer of said four adjacent image samples;

producing an additive inverse of said first difference;

comparing said second difference with said additive inverse of said first difference; and

emphasizing said image when said second difference is greater than or equal to said additive inverse of said first difference.

14. The method of claim 13 wherein said producing comprises multiplying said first difference by -1.

15. The method of claim 13 wherein said emphasizing comprises filtering image samples with a finite-impulse-response differentiating filter.

16. A method of digitally resizing an image, said method comprising:

detecting whether ringing artifacts are present;

suppressing said ringing when detected;

estimating values for first and second gradients during image down-sampling when said ringing is not detected, said gradients used to generate a continuous signal model of said image; and

emphasizing said image during image up-sampling when a first difference between two outer of four adjacent image samples is greater than or equal to said additive inverse of a second difference between two inner of said four samples.

17. Apparatus for suppressing ringing artifacts during digital resizing of an image, said apparatus comprising:

means for calculating a first difference between two inner of four adjacent image samples;

means for calculating a second difference between two outer of said four samples;

means for correcting said first and second differences by inverting the sign of said first and second differences when said first difference is negative;

means for tripling said first corrected difference;

means for comparing said second corrected difference with said tripled first corrected difference; and

means for suppressing ringing artifacts between said two inner samples using a linear interpolation model when said second corrected difference is greater than said tripled first corrected difference;

18. The apparatus of claim 17 further comprising suppressing ringing artifacts between said two inner samples using a linear interpolation model

when said first difference is zero.

19. The apparatus of claim 18 wherein each said suppressing of ringing artifacts occurs independently in each axis in a two dimensional image.

20. The apparatus of claim 18 further comprising using an interpolation model with an emphasized frequency response characteristic with said two inner samples when said second corrected difference is less than the negative of said first corrected difference.

21. The apparatus of claim 20 wherein said interpolation model comprises cubic polynomial models.

22. Apparatus for detecting ringing artifacts during digital resizing of an image, said apparatus comprising:

means for calculating a first difference between two inner of four adjacent image samples;

means for calculating a second difference between two outer of said four samples;

means for comparing said first difference with zero;

means for tripling said first difference; and

means for comparing said second difference with said tripled first difference; wherein:

said ringing is detected when either said first difference equals zero or said second

difference is greater than said tripled first difference.

23. Apparatus for suppressing ringing artifacts during digital image resizing, said apparatus comprising:

means for calculating a difference between two inner of four adjacent image samples;

means for setting a first gradient equal to said difference; and

means for setting a second gradient equal to said difference;

24. The apparatus of claim 23 wherein said first and second gradients are used to generate a continuous signal model of an image being resized.

25. The apparatus of claim 24 wherein said first and second gradients are used to calculate coefficients of said continuous signal model.

26. Apparatus for digitally down-sampling an image, said apparatus comprising:

means for detecting whether ringing artifacts are present;

means for calculating a first gradient as one-half the difference between a third and a first of four adjacent image samples when said ringing is not detected; and

means for calculating a second gradient as one-half the difference between a fourth and a

second of said four samples when said ringing is not detected.

27. The apparatus of claim 26 wherein said first and second gradients are used to generate a continuous signal model of an image being resized.

28. The apparatus of claim 27 wherein said first and second gradients are used to calculate coefficients of said continuous signal model.

29. Apparatus for digitally up-sampling an image, said apparatus comprising:

means for calculating a first difference between two inner of four adjacent image samples;

means for calculating a second difference between two outer of said four adjacent image samples;

means for producing an additive inverse of said first difference;

means for comparing said second difference with said additive inverse of said first difference; and

means for emphasizing said image when said second difference is greater than or equal to said additive inverse of said first difference.

30. The apparatus of claim 29 wherein said producing comprises multiplying said first difference by -1.

31. The apparatus of claim 29 wherein said emphasizing comprises filtering image samples with a finite-impulse-response differentiating filter.

32. Apparatus for digitally resizing an image, said apparatus comprising:

means for detecting whether ringing artifacts are present;

means for suppressing said ringing when detected;

means for estimating values for first and second gradients during image down-sampling when said ringing is not detected, said gradients used to generate a continuous signal model of said image; and

means for emphasizing said image during image up-sampling when a first difference between two outer of four adjacent image samples is greater than or equal to said additive inverse of a second difference between two inner of said four samples.